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References

Aktuell

Böhme 2020

Madelaine Böhme, Nikolai Spassov, Jeremy M. DeSilva & David R. Begun, *Reply to: Reevaluating bipedalism in Danuvius, Replying to S. A. Williams et al. http://doi.org/10.1038/s41586-020-2736-4 (2020).* nature **586** (2020), e4–e5.

The ability of Danuvius to walk bipedally on branches is an apomorphic behaviour that was enabled by the suite of unique morphological adaptations that characterize extended limb clambering. Besides the spinal and tibial characters, the strongly developed cruciate ligaments and the hinge-like morphology of the talocrural joint are consistent with extended limb clambering in Danuvius. Together with a laterally torqued and robust opposable hallux, these features—which are not present in this combination in striding terrestrial bipeds or any extant apes—contributed to increased foot and knee stability during slow and careful bipedal walks on narrow arboreal supports (Fig. 1d).

Karatayev 2020

Vadim A. Karatayev, Madhur Anand & Chris T. Bauch, *Local lockdowns outperform global lockdown on the far side of the COVID-19 epidemic curve.* PNAS **117** (2020), 24575–24580. DOI:10.1073/pnas.2014385117.

pnas117-24575-Supplement.pdf

In the late stages of an epidemic, infections are often sporadic and geographically distributed. Spatially structured stochastic models can capture these important features of disease dynamics, thereby allowing a broader exploration of interventions. Here we develop a stochastic model of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission among an interconnected group of population centers representing counties, municipalities, and districts (collectively, "counties"). The model is parameterized with demographic, epidemiological, testing, and travel data from Ontario, Canada. We explore the effects of different control strategies after the epidemic curve has been flattened. We compare a local strategy of reopening (and reclosing, as needed) schools and workplaces county by county, according to triggers for county-specific infection prevalence, to a global strategy of province-wide reopening and reclosing, according to triggers for province-wide infection prevalence. For trigger levels that result in the same number of COVID-19 cases between the two strategies, the local strategy causes significantly fewer person-days of closure, even under high intercounty travel scenarios. However, both cases and person-days lost to closure rise when county triggers are not coordinated and when testing rates vary among counties. Finally, we show that local strategies can also do better in the early epidemic stage, but only if testing rates are high and the trigger prevalence is low. Our results suggest that pandemic planning for the far side of the COVID-19 epidemic curve should consider local strategies for reopening and reclosing.

Keywords: COVID-19 | pandemic mitigation | spatially structured model | stochastic model | epidemic model

Significance: During the COVID-19 pandemic, decision makers are grappling with how to reopen (and possibly reclose) their jurisdictions as the number of cases ebbs and flows. Establishing a criterion for each county/municipality to open and close based on their case count has appeal, given the wide disparity in COVID-19 rates in urban versus rural settings. Our simulation model is based on the geography, epidemiology, and travel patterns of Ontario, Canada. It shows that the county-by-county approach causes fewer days of closure and impacts fewer people than a strategy that opens or closes the entire province together. This is true even if individuals begin traveling to reopened counties with higher frequency. The county-by-county strategy is most effective when the criteria are coordinated.

Thomas 2020

Loring J. Thomas, Peng Huang, Fan Yin, Xiaoshuang Iris Luo, Zack W. Almquist, John R. Hipp & Carter T. Butts, *Spatial heterogeneity can lead to substantial local variations in COVID-19 timing and severity*. PNAS **117** (2020), 24180–24187. DOI:10.1073/pnas.2011656117.

pnas117-24180-Supplement.pdf

Standard epidemiological models for COVID-19 employ variants of compartment (SIR or susceptible–infectious–recovered) models at local scales, implicitly assuming spatially uniform local mixing. Here, we examine the effect of employing more geographically detailed diffusion models based on known spatial features of interpersonal networks, most particularly the presence of a long-tailed but monotone decline in the probability of interaction with distance, on disease diffusion. Based on simulations of unrestricted COVID-19 diffusion in 19 US cities, we conclude that heterogeneity in population distribution can have large impacts on local pandemic timing and severity, even when aggregate behavior at larger scales mirrors a classic SIR-like pattern. Impacts observed include severe local outbreaks with long lag time relative to the aggregate infection curve, and the presence of numerous areas whose disease trajectories correlate poorly with those of neighboring areas. A simple catchment model for hospital demand illustrates potential implications for health care utilization, with substantial disparities in the timing and extremity of impacts even without distancing interventions. Likewise, analysis of social exposure to others who are morbid or deceased shows considerable variation in how the epidemic can appear to individuals on the ground, potentially affecting risk assessment and compliance with mitigation measures. These results demonstrate the potential for spatial network structure to generate highly nonuniform diffusion behavior even at the scale of cities, and suggest the importance of incorporating such structure when designing models to inform health care planning, predict community outcomes, or identify potential disparities.

Keywords: COVID-19 | spatial heterogeneity | diffusion | health disparities | social networks

Significance: We examine the effects of an uneven population distribution on the spread of the COVID-19 disease spread, using a diffusion model based on interpersonal contact networks. Taking into account spatial heterogeneity, the spread of COVID-19 is much "burstier" than in standard epidemiological models, with substantial local disparities in timing and severity and long lags between local outbreaks. We show that spatial heterogeneity may produce dramatic differences in social exposures to those with the illness, and may stress health care delivery systems in ways that are not well captured by standard SIR-like models.

Williams 2020

Scott A. Williams, Thomas C. Prang, Marc R. Meyer, Gabrielle A. Russo & Liza J. Shapiro, *Reevaluating bipedalism in Danuvius*, *Arising*

from M. Böhme et al. Nature http://doi.org/10.1038/s41586-019-1731-0 (2019). nature **586** (2020), e1–e3.

In summary, Danuvius lacks features associated with bipedal posture and locomotion. Its preserved morphology appears to reflect the increased limb mobility and powerful hallucal grasping that are expected to characterize a relatively large-bodied, tailless arboreal ape13. The discovery of Danuvius substantially contributes to our understanding of hominoid evolution, but relevant comparative data do not support the hypothesis of Böhme et al.1 that the last common ancestor of humans and chimpanzees was a long-backed, lordotic and arboreal biped.

Bibel

Halpern 2000

Baruch Halpern, *The Gate of Megiddo and the Debate on the 10th Century*. In: A. Lemaire & M. Sæbo (Hrsg.), *Congress Volume Oslo 1998*. Vetus Testamentum Supplements 80 (Leiden 2000), 79–121.

All things considered, the traditional assignment of Hazor X, Megiddo VA–IVB and Gezer VIII to the United Monarchy, and to Solomon, is preferable to the alternatives, archaeologically, textually and historically. But the implication is that all this construction, though bankrupting the state, like the palace-temple compound in Jerusalem was designed at least in large measure as a facade, as a means of asserting prestige internationally, as a form of display and, by display, deterrence. Solomon's state was essentially a shell, with tax remission and territorial cession at its base. It was a forerunner to the great monumental city-states of 9th-ccntury Syria only because it represented the first western state formed up as a territorial, national, ethnic entity, based on a nativist impulse (Saulide Israel) converted to internationalism for a time (David, Solomon). The facade, of course, gave out, like other modernizing facades have tended throughout history to do. It left, however, a legacy of aspiration—an identification of the Davidic kingdom with all Israel—that registered ever after in the ideologies of that establishment, and that, too, is an abiding reality, otherwise unattested in the ancient world, whose weight as evidence is not sufficiently understood by those who dismiss the concept of a United Monarchy. Ideology is ideology, and is often manufactured. The form an ideology takes, however, must, like every other variety of evidence, be accorded a proper, rather than a perfunctory, historical analysis. The particular claims of Davidic sovereignty over Israel, in sum, look as though they have a concrete foundation in the 10th century B.C.E. The foundation is not identical with the superstructure, to be sure. But neither is it in any great measure illusory.

Karasik 2020

Avshalom Karasik, Ortal Harush & Uzy Smilansky, *The Morphology of Iron Age Storage Jars and Its Relation to the Handbreadth Measure (Biblical Tefach)*. Bulletin of the American Schools of Oriental Research (2020), preprint, 1–8. DOI:10.1086/710529..

In this paper we compare morphological features of three groups of Iron Age storage jars that were unearthed in several Judahite and Israelite sites. The most famous group is the royal Judahite storage jars with stamped handles ("lmlk," "rosette," etc.). The other two groups are the "Hippo" jars found abundantly in Israelite sites and the jars from Khirbet Qeiyafa (Judah), assigned chronologically to the early 10th century B.C.E. We scanned most of the available jars in 3D and compared them in a detailed morphological study. We extracted several metric

measures and observed large variations between jars within a group and, to a larger extent, between jars from different groups. The only exception is the inner rim diameter, which shows surprising uniformity. Moreover, the distribution of inner rim diameters is consistent with anthropometric measurements of the handbreadth of the human male. We provide a detailed description of our methodology and findings and offer a few alternative explanations for the clear correlation between the measured inner rim diameter and the human tefach.

Keywords: Iron Age pottery | 3D scanning | handbreadth | tefach

Na'aman 1996

Nadav Na'aman, *The Contribution of the Amarna Letters to the Debate on Jerusalem's Political Position in the Tenth Century B.C.E.* Bulletin of the American Schools of Oriental Research **304** (1996), 17–27.

Understanding of the problems involved in the excavations of multilayered highland sites and an examination of the long-range perspective are both essential for the correct appreciation of Jerusalem's political position in the tenth century B.C.E. No negative conclusions about Jerusalem in the Late Bronze II and Iron Age I–IIA should be drawn from the results of the excavations conducted on the Ophel Hill. A comparison between the evidence of the Amarna tablets and contemporaneous archaeological data is essential for the correct evaluation of the data about Jerusalem. Investigation of the archaeological data and written sources indicates that tenth-century Jerusalem must have been a highland stronghold and the center of a kingdom, dominating large, hilly territories with many settlements, and thus was able to expand to nearby lowland territories and possibly even to the areas of neighboring kingdoms. According to "modern" socioarchaeological criteria, the tenth-century kingdom was a prestate, polymorphous chiefdom with Jerusalem as its center of government.

Richelle 2020

Matthieu Richelle, *Did Solomon "overlay the whole Temple with gold"? A New Look at 1 Kings 6:20–22.* Semitica (2020), preprint, 1–14.

Interestingly, if this new proposal is correct, there is an important consequence with regard to the contents of the text: the earliest form of 1 Kings 6 did not assert that all the walls of the Temple were overlaid with gold; it was only the case of the Debir. The notion that "the whole house" was gilded (v. 22a) seems to have been introduced secondarily in the text by a redactor, contrary to what several scholars concluded in the past.

Klima

Aschwanden 2020

Andy Aschwanden, *The worst is yet to come for the Greenland ice sheet.* nature **586** (2020), 29–30.

An assessment of past, present and future ice loss from the Greenland ice sheet shows that rates of loss in the twenty-first century will be much higher than those at any time during the past 11,700 years.

Berner 2020

Logan T. Berner et al., *Summer warming explains widespread but not uniform greening in the Arctic tundra biome.* Nature Communications **11** (2020), 4621, 1–12. DOI:10.1038/s41467-020-18479-5.

NatComm11-a04621-Supplement.pdf

Arctic warming can influence tundra ecosystem function with consequences for climate feedbacks, wildlife and human communities. Yet ecological change across the Arctic tundra biome remains poorly quantified due to field measurement limitations and reliance on coarseresolution satellite data. Here, we assess decadal changes in Arctic tundra greenness using time series from the 30m resolution Landsat satellites. From 1985 to 2016 tundra greenness increased (greening) at ≈37.3 % of sampling sites and decreased (browning) at ≈4.7 % of sampling sites. Greening occurred most often at warm sampling sites with increased summer air temperature, soil temperature, and soil moisture, while browning occurred most often at cold sampling sites that cooled and dried. Tundra greenness was positively correlated with graminoid, shrub, and ecosystem productivity measured at field sites. Our results support the hypothesis that summer warming stimulated plant productivity across much, but not all, of the Arctic tundra biome during recent decades.

Logan T. Berner, Richard Massey, Patrick Jantz, Bruce C. Forbes, Marc Macias-Fauria, Isla Myers-Smith, Timo Kumpula, Gilles Gauthier, Laia Andreu-Hayles, Benjamin V. Gaglioti, Patrick Burns, Pentti Zetterberg, Rosanne D'Arrigo & Scott J. Goetz

Briner 2020

Jason P. Briner et al., *Rate of mass loss from the Greenland Ice Sheet will exceed Holocene values this century*. nature **586** (2020), 70–74.

n586-0070-Supplement1.mp4, n586-0070-Supplement2.mp4

The Greenland Ice Sheet (GIS) is losing mass at a high rate1. Given the short-term nature of the observational record, it is difficult to assess the historical importance of this mass-loss trend. Unlike records of greenhouse gas concentrations and global temperature, in which observations have been merged with palaeoclimate datasets, there are no comparably long records for rates of GIS mass change. Here we reveal unprecedented mass loss from the GIS this century, by placing contemporary and future rates of GIS mass loss within the context of the natural variability over the past 12,000 years. We force a high-resolution ice-sheet model with an ensemble of climate histories constrained by ice-core data2. Our simulation domain covers southwestern Greenland, the mass change of which is dominated by surface mass balance. The results agree favourably with an independent chronology of the history of the GIS margin3,4. The largest pre-industrial rates of mass loss (up to 6,000 billion tonnes per century) occurred in the early Holocene, and were similar to the contemporary (ad 2000–2018) rate of around 6,100 billion tonnes per century5. Simulations of future mass loss from southwestern GIS, based on Representative Concentration Pathway (RCP) scenarios corresponding to low (RCP2.6) and high (RCP8.5) greenhouse gas concentration trajectories6, predict mass loss of between 8,800 and 35,900 billion tonnes over the twenty-first century. These rates of GIS mass loss exceed the maximum rates over the past 12,000 years. Because rates of mass loss from the southwestern GIS scale linearly5 with the GIS as a whole, our results indicate, with high confidence, that the rate of mass loss from the GIS will exceed Holocene rates this century.

Jason P. Briner, Joshua K. Cuzzone, Jessica A. Badgeley, Nicolás E. Young, Eric J. Steig, Mathieu Morlighem, Nicole-Jeanne Schlegel, Gregory J. Hakim, Joerg M. Schaefer, Jesse V. Johnson, Alia J. Lesnek, Elizabeth K. Thomas, Estelle Allan, Ole Bennike, Allison A. Cluett, Beata Csatho, Anne de Vernal, Jacob Downs, Eric Larour & Sophie Nowicki

Caramanica 2020

Ari Caramanica, Luis Huaman Mesia, Claudia R. Morales, Gary Huckleberry, Luis Jaime Castillo B. & Jeffrey Quilter, *El Niño resilience farming on the north coast of Peru*. PNAS **117** (2020), 24127–24137.

pnas117-24127-Supplement.pdf

El Niño–Southern Oscillation has been treated as a disruptor of environmental and socioeconomic equilibrium both in ancient times and in modern-day Peru. Recent work in the coastal desert plain, known as the Pampa de Mocan, challenges this view by demonstrating that prehispanic irrigation systems were designed to incorporate floods and convert them into productive waters. Archaeological investigations in this landscape reveal a 2,000-y history of floodwater farming embedded in conventional canal systems. Together with a pollen record recovered from a prehispanic well, these data suggest that the Pampa de Mocan was a flexible landscape, capable of taking advantage of El Niño floodwaters as well as river water. In sharp contrast to modern-day flood mitigation efforts, ancient farmers used floodwaters to develop otherwise marginal landscapes, such as the Pampa de Mocan, which in turn mitigated risk during El Niño years. These archaeological data speak to contemporary policy debates in the face of increasingly intense and frequent natural disasters and question whether El Niño Southern Oscillation events should be approached as a form of temporary disorder or as a form of periodic abundance.

Keywords: archaeology | irrigation agriculture | ENSO | pollen | floodwater farming

Significance: Disaster management policies are aimed at system resistance: Maintaining or quickly returning to operations established during normal periods. The Peruvian approach to El Niño follows this model, but the cost of reconstruction rises with each event. Meanwhile, archaeological evidence demonstrates that El Niño events were successfully managed by prehispanic farmers, who developed resilient hybrid canal systems that utilized both river water and floodwater for agricultural production. Ancient farmers treated the El Niño phenomenon as part of the norm, and likewise accounted for floodwaters in their irrigation technology. This study calls for a conceptual shift as effective disaster management policy is developed in the context of the global climate crisis.

Ma 2020

Ting Ma, Barry V. Rolett, Zhuo Zheng & Yongqiang Zong, *Holocene coastal evolution preceded the expansion of paddy field rice farming*. PNAS **117** (2020), 24138–24143.

pnas117-24138-Supplement1.pdf, pnas117-24138-Supplement2.xlsx

Rice agriculture is the foundation of Asian civilizations south of the Yangtze River. Although rice history is well documented for its lower Yangtze homeland area, the early southward expansion of paddy rice farming is poorly known. Our study investigates this process using a compilation of paleoenvironmental proxies from coastal sediment cores fromsoutheast China to Thailand and Island Southeast Asia. We propose that a shortage of land suitable for paddy fields, caused by marine transgression, constrained rice agriculture during the midHolocene. Rapid expansion of coastal plains, particularly in deltaic basins, over the past three millennia has coincided with increases in land suitable for rice cultivation. Our study also helps explain the past population movements of rice farmers.

Keywords: early agriculture | Holocene paleoenvironment | rice | land cover change | pollen

Significance: Our study reveals a remarkable relationship between Late Holocene coastal evolution and the rise of rice agriculture across coastal Asia. Around 2,000

to 3,000 y ago, the emergence of coastal plains under freshwater conditions created expansive areas suitable for rice. We estimate that over the past three millennia the extent of coastal land suitable for wetland rice cultivation grew from about 16,000 km2 to 96,000 km2. Intensive paddy field farming took hold rapidly as coastal landscapes changed. Thus, large-scale rice farming was not established in southern China and Southeast Asia until rather late in the Holocene. This model helps explain ancient DNA evidence suggesting a major Bronze Age demographic expansion of rice farmers of northern East Asian descent.

Methoden

Thomas 2020

Suzie Thomas, Bonnie L. Pitblado, Pieterjan Deckers, Joe Watkins & Morag M. Kersel, *The dangers of conflating responsible and responsive artefact stewardship with illicit and illegal collecting*. Antiquity **94** (2020), 1060–1079.

Archaeology and private artefact collecting have complex and inextricably linked histories. Archaeologists have long drawn attention to criminal activity among collectors, but to assume that all private owners of cultural material—and any archaeologists who interact with them—have ill-intent or engage in illegal behaviour can cause as much harm to the archaeological record as the criminal actions themselves.

Keywords: responsible stewardship | artefact collection | professional archaeology

Religion

Ibáñez 2020

Juan José Ibáñez et al., *Flint 'figurines' from the Early Neolithic site of Kharaysin, Jordan*. Antiquity **94** (2020), 880–899.

During the Early Neolithic in the Near East, particularly from the mid ninth millennium cal BC onwards, human iconography became more widespread. Explanations for this development, however, remain elusive. This article presents a unique assemblage of flint artefacts from the Middle Pre-Pottery Neolithic B (eighth millennium BC) site of Kharaysin in Jordan. Contextual, morphological, statistical and usewear analyses of these artefacts suggest that they are not tools but rather human figurines. Their close association with burial contexts suggests that they were manufactured and discarded during mortuary rituals and remembrance ceremonies that included the extraction, manipulation and redeposition of human remains.

Keywords: Pre-Pottery Neolithic | Near East | Jordan | Kharaysin | figurines | mortuary practices

Juan José Ibáñez, Juan R. Muñiz, Thomas Huet, Jonathan Santana, Luis C. Teira, Ferran Borrell, Rafael Rosillo & Eneko Iriarte